



# DNV Seminar

## Type and Project Certification - Wind Farms

The seminar will last for two days and is intended for technical staff/engineers and project managers working with design and certification of wind turbines and support structures for onshore and offshore wind farms.

### WHY ATTEND?

Running a certification process will ensure that your product adheres to standards. However, in a market with scarce resources and strong growth it is important to understand the mechanisms of the certification process and how to interpret the regulatory requirements to save time and costs.

The course is designed to offer:

1. Introduction to DNV standards and related international standards, in particular the IEC 61400 series.
2. Presentation of the verification process according to DNV-OS-J101, DNV-DS-J102, IEC 61400-22 and how it contributes positively in the design phase. Understanding the early verification process will minimize the need for late design changes.
3. Discussion of the documentation requirements including:
  - Interpretation of the site specific conditions and the impact on project costs.
  - Procedures for design control and the link to the manufacturer's quality management system.
4. Discussion of the correlation between the project stakeholders (e.g. developer, turbine supplier and substructure designer) and the significance on project costs and the certification process.
5. Presentation of DNV offshore standard DNV-OS-J201 for Offshore Substations.
6. Presentation of optional DNV services related to project certification including Navigational Risk Assessment, Cable Damage, Fire Safety, Health, Safety and Environmental Risk Management.
7. The seminar offers networking opportunities with fellow participants in the industry and a unique opportunity to get to know the people at DNV.

The seminar is offered in English, and run by DNV experts from the Cleaner Energy business area.

### FEE:

EUR 1500 per person. The fee includes lunches and 1 dinner, tuition material, test (optional) and a diploma.

# Registration

## ONLINE REGISTRATION FORM:

Please fill in the registration form below or [click here](#) to register online on [www.dnv.dk](http://www.dnv.dk).



## DATES:

- 30-31 January 2012 (Monday + Tuesday), DNV, Copenhagen, Denmark
- 12-13 April 2012 (Thursday + Friday), DNV, Copenhagen, Denmark

## HOURS:

9:00 - 17:30 (both days)

## CLOSING DATE FOR REGISTRATION:

2 weeks prior first day of seminar.

## PAYMENT AND CANCELLATION CONDITIONS:

If you cancel your participation before closing date we charge a cancellation fee of 50% of the seminar fee. Cancellations after closing date will be charged with 100% of the seminar fee. Instead of a cancellation we accept the nomination of an alternative participant.

## CONTENTS OF THE SEMINAR:

Please find it on pages 3-5.

## PRACTICAL DETAILS:

Confirmation, practical details and invoice will be mailed to you.

For further information please contact [Lone.Wigh@dnv.com](mailto:Lone.Wigh@dnv.com)

## DNV's wind energy offices:

### Americas

USA (Seattle, Boston, Houston)  
Canada (Calgary)  
Brazil (Rio)

### Asia

Korea (Pusan)  
China (Shanghai)  
Singapore  
India (Hyderabad)

### Europe

UK (London, Aberdeen, Manchester)  
Denmark (Copenhagen)  
Germany (Essen, Hamburg)  
Norway (Oslo)

MANAGING RISK



# Contents of the seminar:

## WELCOME

- Presentation of DNV Cleaner Energy services and competences

## INTRODUCTION TO TYPE AND PROJECT CERTIFICATION

- Overview of type and project certification and their relation
- Presentation of main standards and regulatory requirements
- The value of certification and when to begin

## TURBINE CERTIFICATION

### Introduction to Type Certification

- Design Basis
- Design Evaluation
- Manufacturing Evaluation
- Type Testing
- Type Characteristics Measurements
- Foundation Design Evaluation
- Final Evaluation / Type Certificate
- Maintenance of Type Certificate

The lecture will give an overview of the elements required for type certification of a wind turbine or wind turbine component as well as overview of the main standards to be applied. The possibilities and limitations for certification of components including provisional certificates will be discussed.

## PROJECT CERTIFICATION

Explanation of the technical terms around an integrated structure for offshore wind farms

### Site Specific Conditions

- Soil
- Wind (turbulence, mean, wind profile, hill slope, wake, density)
- Data collection methods and quality
- Bathymetry (seabed movement)
- Sea (waves, current, ice, tide)
- Correlation between wind, waves, current, and water levels

## DESIGN BASIS

### Loads on Wind Turbine and Support Structures

- Turbine concepts
- Load types

### Input required for performing load analysis

- Explanation of individual load case requirements according to DNV-OS-J101/ IEC 61400-3/IEC 61400-1. The interpretation of the site specific conditions is critical for the establishment of the design loads and consequently for the project costs.



# Contents of the seminar:

## DESIGN

- Foundation Concepts
- Description
- Range of application and influence of different limits for design
- Input data necessary for design of each typology
- Steel Structures - Jacket / Monopile
- Concrete Structures - Monopile / Gravity
- Grouted Connections
- Discussion of the challenges in use of e.g. modern Finite Element systems and 'automatic' generated analysis results. Examples of misleading analysis results will be presented
- Manufacturing Survey, Installation, Commissioning and In-service

## CORROSION PROTECTION

- Corrosion Zones
- Corrosion mechanisms and corrosion forms
- Design of corrosion control (coatings, cathodic protection, corrosion resistant materials)
- Inspection and maintenance of corrosion control

The lecture will be based on Sec. 11 of DNV-OS-J101 and refer to DNV-RP-B401 for cathodic protection and NORSOK M-501 for corrosion protective coatings as the primary standards for corrosion control of substructures in steel.

## SUBSTATIONS

- Overview of current substation installations and future trends
- Presentation of DNV offshore standard DNV-OS-J201 for Offshore Substations
- Main design principles and requirements, current best industry practice

The lecture will present the rules and regulations for installation, based on DNV rules and include examples based on 30 years experience with marine operations in the offshore industry. The lecture will focus on why planning is important and how contractors that are used to work onshore can adopt the offshore rules.

## HEALTH, SAFETY AND ENVIRONMENTAL RISK MANAGEMENT

- Brief review of safety requirements in the offshore wind industry
- Country-specific difference, e.g. UK and Germany
- Learning from offshore oil & gas
- Introducing a safety culture

## FIRE SAFETY IN WIND FARMS

- Fire risk identification in a wind turbine
- Fire safety aspects in offshore transformer platforms
- Special fire safety issues on accommodation platforms

Introduction to the Fire and Explosion Protection of the offshore standard DNV-OS-J201 and how to over such risks.

## DOCUMENTATION

- Design reports
- Design drawings, specifications
- Manufacturing specifications

The lecture will discuss the documentation needed for type certification and address the link to the manufacturer's quality management system.



# Contents of the seminar:

## **CERTIFICATION OF WIND TURBINE COMPONENTS**

- Standards for Wind Turbine Component Certification
- Wind Turbine Components
- Design reports
- Design drawings, specifications
- Discussion of the challenges in use of e.g. modern Finite Element systems and 'automatic' generated analysis results

## **SITE SPECIFIC APPROVALS AND MODIFICATION OR RENOVATION OF WIND TURBINES**

- Obligations of the Manufacturer
- Surveillance / Inspection
- Possibilities and limitations
- Link to Project Certification

The lecture will address how the type certificate may be used by the wind turbine manufacturer for documentation of wind turbines for various projects, and how modifications can be introduced for already certified wind turbines.

## **CLOSING SESSION:**

Lessons learned, test (optional) and diploma.